

WHAT IS CLAIMED IS:

~~1. A method of detecting edges of features in digital images comprising:~~

5 computing a first luminance characteristic of a selected region of an input digital image;
 computing a second luminance characteristic of said selected region of said input digital image, said first and second luminance characteristics being related to variations of luminance values within said
 10 selected region; and
 determining whether either one of said first and second luminance characteristics exceeds a predefined threshold, which is indicative of a presence of an edge of a feature in said selected region of said input digital image.

15 2. The method of claim 1 wherein said step of computing said first luminance characteristic includes computing a two-dimensional luminance gradient value for said selected region of said input digital image.

20 3. The method of claim 2 wherein said step of computing said two-dimensional luminance gradient value includes using a vertical gradient mask and a horizontal gradient mask to derive said two-dimensional luminance gradient value.

25 4. The method of claim 3 further comprising a step of applying a low-pass noise filter to said selected region of said input digital image.

 5. The method of claim 4 wherein said step of applying said low-pass noise filter includes using a low-pass noise filtering mask as follows:

30
$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}.$$

6. ~~The method of claim 5 wherein said vertical gradient mask and said horizontal gradient mask incorporate said low-pass noise filtering mask, said vertical gradient mask and said horizontal gradient mask being respectively as follows:~~

$$5 \quad \begin{bmatrix} -1 & -4 & -6 & -4 & -1 \\ -2 & -8 & -12 & -8 & -2 \\ 0 & 0 & 0 & 0 & 0 \\ 2 & 8 & 12 & 8 & 2 \\ 1 & 4 & 6 & 4 & 1 \end{bmatrix} \quad \begin{bmatrix} -1 & -2 & 0 & 2 & 1 \\ -4 & -8 & 0 & 8 & 4 \\ -6 & -12 & 0 & 12 & 6 \\ -4 & -8 & 0 & 8 & 4 \\ -1 & -2 & 0 & 2 & 1 \end{bmatrix}.$$

7. The method of claim 2 wherein said step of computing said second luminance characteristic includes computing a two-dimensional luminance curvature value for said selected region of said input digital image.

8 The method of claim 7 wherein said step of computing said two-dimensional luminance curvature value includes using a vertical curvature mask and a horizontal curvature mask to derive said two-dimensional luminance curvature value.

9. The method of claim 8 wherein said vertical curvature mask and said horizontal curvature mask incorporate a low-pass noise filtering mask of

$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix},$$

20 said vertical curvature mask and said horizontal curvature mask being respectively as follows:

$$\begin{bmatrix} -1 & -4 & -6 & -4 & -1 \\ 0 & 0 & 0 & 0 & 0 \\ 2 & 8 & 12 & 8 & 2 \\ 0 & 0 & 0 & 0 & 0 \\ -1 & -4 & -6 & -4 & -1 \end{bmatrix} \quad \begin{bmatrix} -1 & 0 & 2 & 0 & -1 \\ -4 & 0 & 8 & 0 & -4 \\ -6 & 0 & 12 & 0 & -6 \\ -4 & 0 & 8 & 0 & -4 \\ -1 & 0 & 2 & 0 & -1 \end{bmatrix}.$$

10. The method of claim 1 further comprising a step of determining whether the maximum luminance value of said selected region of said input digital image exceeds a predefined luminance threshold.

5 11. The method of claim 1 further comprising a step of determining whether the maximum chrominance value of said selected region of said input digital image exceeds a predefined chrominance threshold.

12. The method of claim 1 further comprising a step of counting the
10 number of chrominance values within said selected region of said input digital image that exceeds a predefined chrominance threshold.

13. A system for detecting edges of features in digital images comprising:

15 a first filter for computing a first luminance characteristic of a selected region of an input digital image;

a second filter for computing a second luminance characteristic of said selected region of said input digital image, said first and second luminance characteristics being related to variations of
20 luminance values within said selected region; and

means for determining whether either one of said first and second luminance characteristics exceeds a predefined threshold, which is indicative of a presence of an edge of a feature in said selected region of said input digital image.

25 14. The system of claim 13 wherein said first filter is configured to compute a two-dimensional luminance gradient value for said selected region of said input digital image.

30 15. The system of claim 14 wherein said second filter is configured to compute a two-dimensional luminance curvature value for said selected region of said input digital image.

16. ~~The system of claim 13 further comprising a luminance detector~~
operatively coupled to said first and second filters, said luminance detector
being configured to determine whether the maximum luminance value of
said selected region of said input digital image exceeds a predefined
5 luminance threshold.

17. The system of claim 13 further comprising a color detector
operatively coupled to said first and second filters, said color detector
being configured to determine whether the maximum chrominance value
10 of said selected region of said input digital image exceeds a predefined
chrominance threshold.

18. A method of detecting edges of features in digital images
comprising:

15 computing a first luminance characteristic of a selected
region of an input digital image, said first luminance characteristic being
related to variations of luminance values within said selected region;
extracting the maximum luminance value from said selected
region of said input digital image; and
20 comparing said first luminance characteristic and said
maximum luminance value to corresponding thresholds to determine
whether said selected region of said input digital image includes an edge
of a text.

25 19. The method of claim 18 wherein said step of computing said first
luminance characteristic includes computing a two-dimensional luminance
gradient value for said selected region of said input digital image.

30 20. The method of claim 18 wherein said step of computing said first
luminance characteristic includes computing a two-dimensional luminance
curvature value for said selected region of said input digital image.

21. The method of claim 18 further comprising a step of computing a second luminance characteristic of said selected region of said input digital image, said second luminance characteristic being related to variations of luminance values within said selected region of said input digital image.

22. The method of claim 21 wherein said step of computing said second luminance characteristic includes computing a two-dimensional luminance gradient value or a two-dimensional luminance curvature value for said selected region of said input digital image.

23. The method of claim 18 further comprising a step of determining whether the maximum chrominance value from said selected region of said input digital image exceeds a predefined chrominance threshold.